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(54) Title: **WATER-RETAINING STRUCTURE**

(57) Abstract: Device for retaining water comprising a foundation, a retaining wall movably attached to the foundation and a shore movably, particularly hingingly, attached to the foundation, in which the shore and the retaining wall are movably, particularly hingingly, attached to each other, and in which the retaining wall is provided with at least an internal longitudinal hinge about which the retaining wall can be turned.



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### Water-retaining structure

The invention relates to a water-retaining structure that may be latently present and in case of high tide/flood to be retained can be erected.

Such water-retaining structures have been widely known for a long time.

5 The weirs in deltas or rivers, such as storm surge barriers, but also structures to be put on dikes or quays, such as De Muralt walls or inflatable tubes come to mind here.

10 Such structures offer a provision for temporarily increasing the water-retaining height. This may be a solution in case the water-retaining main body offers an insufficient height for an economically acceptable barrier. In that case the foot of the main body need not be adjusted. This becomes more and more important, due to the rising average sea water level and the ever increasing river discharge.

15 It may regard the provision of a water-retaining structure for an urban area, but also for a rural area, in case the damage to be expected is high enough, and furthermore for industrial zones, such as brickworks, that are situated in an area of increased inundation risk.

20 A problem occurring here is that the space available often is too limited.

It is an object of the invention to provide a water-retaining structure which in the inoperative position takes up little space.

25 A further object of the invention is to provide a water-retaining structure that is easy to place.

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Yet a further object of the invention is to provide a water-retaining structure that can quickly be erected from the inoperative position into an operative position.

5 From one aspect the invention to that end provides a device for retaining water comprising a foundation, a retaining wall movably attached to the foundation and a shore movably, particularly hingingly, attached to the foundation, in which the shore and the retaining wall are movably, particularly hingingly, attached to each other, and in which the retaining wall  
10 is provided with at least an internal longitudinal hinge about which the retaining wall can be turned.

In this way the water-retaining wall can be folded and unfolded, respectively, onto itself, so that in the non-operative position little space is taken  
15 up whereas the retaining wall can be completely active in the retaining position.

The water-retaining structure according to the invention as a result is very suitable for placement at a location where there is little space, such as on a  
20 dike.

Preferably the retaining wall is provided with several internal longitudinal hinges situated at transverse distance from each other, so that it can be folded down several times and the space it takes up in folded position can  
25 even be relatively smaller.

Preferably the retaining wall can be folded and unfolded between a non-operative position, in which the retaining wall is substantially horizontally situated, and a raised, retaining operative position. In this way the size of  
30 the structure, particularly in vertical direction in the foundation, can be kept limited. The raised operative position can be substantially vertical.

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Preferably the longitudinal hinge is adapted for a hinging movement on the side of the water to be retained, in which the retaining wall preferably is provided with stop means for limiting the rotation of the longitudinal hinge. The folding movement of the retaining wall members will take place here at  
5 the water side, where there is free space. Furthermore the water pressure in the water to be retained will cooperate in keeping the retaining wall unfolded.

Preferably means are provided for locking the longitudinal hinge in the  
10 upright position of the retaining wall, so that a rigid wall can be obtained.

In a preferred embodiment an internal longitudinal hinge, particularly the lowermost, is situated at the location of the connection of the shore to the retaining wall. In this way two connections almost coincide, as a result of  
15 which it is possible that the limiting or locking means are also adapted for securing the shore to the retaining wall.

In a further development of the water-retaining structure according to the invention the foundation is provided with an accommodation space for the  
20 retaining wall in a position folded about the at least one longitudinal hinge. The accommodation space protects the water-retaining structure when not used, in which both margin areas of the accommodation space can also serve as support for the shore and the retaining wall.

25 Preferably the foundation comprises a substantially U-shaped body.

When the foundation is provided with a base plate extending downward from it, said plate not only has a founding function, but it also counteracts the flow of water underneath the water-retaining structure, which is of  
30 importance in case of placement in/on a body of a dike.

The shore can be hinged between a sideward downfolded position and an

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operative position, and in downfolded position can be accommodated in the accommodation space.

5 The use of the accommodation space renders it possible that the retaining wall forms a lid for the accommodation space, as a protection, but possibly as a road surface as well, for public transport or for inspection. Due to its water-retaining construction the retaining wall will be suitable for carrying traffic loads.

10 Alternatively the shore may be plate-shaped. In case of -wanted or unwanted- overflowing water, the shore may serve as landsided guidance for said water. In case at least one of the connections of retaining wall and shore to the foundation can be moved in horizontal direction, a water-retaining structure is obtained of which the crown level can be  
15 manipulated.

From a further aspect the invention provides a device for retaining water comprising a foundation, a retaining wall movably attached to the foundation and a shore movably, particularly hingingly, attached to the foundation, in which the shore and the retaining wall are movably, particularly  
20 hingingly, attached to each other, and in which at least one of the connections of the retaining wall and shore to the foundation can be moved and adjusted in horizontal direction, preferably continuously variable and in a driven manner.

25 The water-retaining structure can in that form be used as spillway for deflecting water in a high water/tide wave in a river to an overflow area at the wanted moment. The water-retaining structure, however, can also be deployed in overflow areas for high sea water.

30 The water-retaining structure may to that end be incorporated in the crown of body of a dike, in which the connections with the foundation are

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situated at a distance below the dike crown. Thus a chosen passage below the dike crown can be realised, so that water can be let through before the water level has risen to the crown level and otherwise water would spill at any location along the dike.

5

The invention further relates to an assembly of a number of water-retaining structures according to the invention, arranged in line, in which the retaining walls can be separately erected and folded.

10

The invention will be elucidated on the basis of a number of exemplary embodiments shown in the attached drawings, in which:

Figure 1 shows a first embodiment of a water-retaining structure according to the invention in erected position;

15

Figure 2 shows the water-retaining structure of figure 1, in a slightly adjusted form, and in series in erected position;

Figures 3A-C shows the water-retaining of figure 2, in various positions;

20

Figure 4 shows a cross-section of the water-retaining structure of figure 1 in folded position;

Figure 5 shows a detail of a hinge in the water-retaining structure of figures 1 and 2;

25

Figure 5A shows a detail of a locking of another hinge in the water-retaining structure of the preceding figures;

30

Figure 6 shows a schematic top view of an arrangement with a water-retaining structure according to the invention;

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Figure 7 shows an alternative embodiment of a water-retaining structure according to the invention;

5        Figures 8 and 9 show a further alternative of a water-retaining structure according to the invention;

Figure 10 shows a detail of a hinge bearing in the water-retaining structure of figures 8 and 9;

10       Figure 10A shows a further elucidation of it;

Figures 11A-C shows some connection details between adjacently placed water-retaining structures according to the invention; and

15       Figure 12 shows a possible other arrangement of a water-retaining structure according to the invention;

Figures 13A,B show some possible arrangements of water-retaining structures according to the invention as a spillway.

20       The water-retaining structure in figure 1 comprises a retaining wall 1, which, in this example, consists of three wall members 1a, 1b and 1c, which are hingingly connected to each other by means of longitudinal hinges 2a, 2b. The retaining wall members 1a, 1b and 1c can be made of  
25       metal plate, and reinforced by vertical girders 24 and by horizontal girders 23. As is suggested in figure 2, the vertical girders 24 may also be box girders.

30       The water-retaining structure is furthermore provided with a shore plate 5, which may also be made of metal, and which may be provided with reinforcement girders at the bottom side (which is not shown).

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Both the retaining wall 1 and the shore plate 5 are hingingly mounted at the location of 6 or 7, respectively. At that location the water-retaining structure is supported on a U-shaped concrete foundation 3, which is sunk into the crown of a body of a dike 11. In a similar way 11 may also refer to a quay or the like.

The foundation 3, also shown in figure 2, forms an accommodation space 4 and has longitudinal holes 13, in which connecting pens 21 can be inserted, for coupling the adjacently situated foundations 3 in longitudinal direction. At the lower end, the foundation 3 may merge into an inverted U-shape 3a, for fitting engagement of a ground sealing plate 16, which may have a function in transferring vertical forces, but also in the prevention of a horizontal waterflow through the body of a dike. Depending on the ground characteristics, the plate 16 may extend more or less deeply. During the penetration of the plate 16 into the ground, said ground may be compacted under conditions, as a result of which the leakage flows are further counteracted.

As can be seen the longitudinal hinge 6 is situated near the bottom of the accommodation space 4, and the hinge 5 is situated near its top side. As a result it is possible that the retaining wall 1 in folded position -shown in figure 4, in which the wall member 1c had been folded down onto wall member 1b and the assembly of wall members 1b and 1c has been folded down onto wall member 1a- has been horizontally and appropriately accommodated in the accommodation space 4, but that just above it there still is room for horizontal placement of the shore plate 5. As can be seen in figure 4 the shore plate 5 is supported on both longitudinal edges of the accommodation space 4. Furthermore a discharge line 9 is shown for water that has unwantedly ended up in accommodation space 4.

As can be seen in figure 5 a locking pin 47 has been provided at the lower edge of wall member 1b, and a cavity 48 intended for said locking pin has



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been provided in the opposite upper edge of wall member 1a. When wall member 1b is swung in the direction A with respect to wall member 1a during erecting the retaining wall 1, said lower edge and upper edge from a stop one to the other, which is a limitation for the hinging movement in the direction A. The limit is reached in the situation shown in figure 1.

Special here is that the connection in question is also used for securing the shore plate 5 by engagement. To that end the upper edge of wall member 1a is shaped to match the free edge of shore plate 5. In its free edge the shore plate 5 is provided with holes 49, for passage of a locking pin 47. After a triangle has been formed by erection, the hinges 6, 7 and the bearing of the edge of shore plate 5 on the upper edge of wall member 1 constituting the vertices of the triangle, rotation in the direction A of wall member 1b until abutment against the edge of shore plate 5 and insertion of the locking pins 47 in the holes, will ensure fixation of the plates 1a, 1b and 5 in the position shown in figure 1. The plate 5 will then as it were be clamped in between the wall members 1a and 1b. It is also possible that the plate 5 has been provided with a downwardly extending rib or a series of protrusions, which fit in a continuous cavity 48 (or a series of cavities 48), and that the locking pins can extend through them, or that separate cavities 48 have been provided to that end.

In figure 5A it is shown how the position of the wall members 1b and 1c in figure 1 can also be secured. The wall member 1c is provided here with a number of locking pins 50 that can be slid along said wall member, which pins may be engaged by protrusion 51. They can be reciprocally vertically slid in the direction B and may be accommodated in sleeves 24, shown in figure 2.

The upper edge of the extension of the sleeves 24 in wall member 1b is suitable for receiving the locking pins 50. As soon as the wall members 1a and 1b are folded out to be aligned with each other, as shown in figure 1,

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the locking pins 50 are operated by lowering them from the position in which they are entirely accommodated in wall member 1c into the snug accommodation spaces in the sleeves 24 of wall member 1b

- 5 It is emphasized that these are but a number of possible examples and that other locking mechanism are possible as well.

10 The figures 3A-C schematically show how the erection generally takes place. The situation shown in figure 3A corresponds to the one of figure 4, and the situation shown in figure 3C corresponds to the one shown in figure 1. First the shore plate 5 is folded out, so that the folded retaining wall 1 can be reached. If necessary means may be provided for keeping the shore plate 5 in the wanted position. If necessary the shore plate 5 can be kept vertical for a short while. Subsequently the wall member 1b is  
15 turned upwards in the direction A and simultaneously or subsequently the wall member 1c. The locking of the end positions can take place as mentioned above. The fold out direction here is facing away from the high water.

- 20 The result is a slim retaining wall or water-retaining structure, which despite the horizontal direction takes up little room and is still able to extend sufficiently high.

25 In the folded in position the shore wall or shore plate may serve as traffic lane. Also in cases of emergency all locations of the water-retaining structure can be easily reached everywhere over it, in order to erect the water-retaining structure at the wanted locations.

30 Figure 6 shows a number of water-retaining structures according to the preceding figures arranged on a body of a dike 11, in which the curve of the body of a dike 11 is followed. The water-retaining structures each have three shore plates 5 here. The intermediate spaces between the con-

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secutive water-retaining structures are filled with tapering filling bodies 10, as a result of which both bends to the left and to the right can be followed. The water-retaining structure is shown here in folded position.

5 In figure 7 an alternative embodiment of the water-retaining structure according to the invention is shown, in which a difference with the previous embodiment is the fact that now there are only two retaining wall members 1a and 1b, and a number of lattice structure-like shore constructions 105 spaced apart in longitudinal direction of the water-retaining  
10 structure, which shore constructions 105 can be folded in or can be unfolded in longitudinal direction of the water-retaining structure about hinge 107. Comparable construction parts have the same reference numbers, increased by 100. In this case as well, the hinge for the retaining wall is situated lower than the one for the shore, and the lowermost  
15 retaining wall member 101a is the last one to be laid in the accommodation space 104. The lattice structure like shore construction 105 also supports the wall member 101b over a considerable part of its height.

In figure 8 a comparable alternative embodiment of the water-retaining  
20 structure is shown, which is also built up from two retaining wall members 200a, 201b that are hingingly connected to each other at the location of 202a. At the location of 206 the retaining wall member 201a is hingingly connected to the foundation 203, which in this case consists of a steel container defining the accommodation space 204. At the land side, the  
25 foundation 203 is provided with a sheet piling 216b (also see figure 9) which also forms a water-retaining screen, and further with poles 216a at the waterside. Just like in the embodiment of figure 1 the accommodation space 204 is drained and water can be discharged by means of discharge  
30 line 209, extending in longitudinal direction of the water-retaining structure.

In this example the retaining wall member 201b that is situated above in

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the active position, lies beneath the retaining wall member 201a when in the storage position. The hinging movement during erection therefore is different from the one in the preceding figures, and now in direction G.

5       At its upper edge, as can be seen in figure 9, the retaining wall member 201a itself forms a stop against retaining wall member 201b tilting through too far.

10       At the location of hinge 207, of which the horizontal axis of rotation lies in the plane of drawing, the shore 205 is hingingly connected to the foundation 203. When erecting, the shore rod 205 can be erected into the position shown in figure 9, in order to be coupled in a secure way at the location of 240 to coupling provision 241 that is not further shown in retaining wall member 201b. The hinge 202a can be fixated or locked in  
15       the position shown in figure 9 with means that are not further shown, for instance corresponding to the locking with locking pins according to figure 5A, in order to rule out any risk of swinging through.

20       It is noted that in this example a sealing of the accommodation space 204 is ensured by the retaining wall member 201a itself. The shore 205 may be provided with a hinge 242, so that, as shown in figure 8, it may be accommodated folded down next to the folded assembly of retaining wall members 201a and 201b in the accommodation space 204. The unfolding direction here is towards the water to be retained.

25       In the figures 10 and 10A a possible embodiment of the hinge 206 of the water-retaining structure of the figures 8 and 9 is shown. At the foundation 203 a hinge seat 260 has been welded, which forms a straight circle-cylindrical bowl 261 for the hinge rod 262, which is welded to  
30       retaining wall member 201a. When erecting the retaining wall member 201a in the direction C it will rotate together with the hinge rod 262 about the hinge point S.

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In order to prevent leakage at the location of the hinge point, the longitudinal edge of the retaining wall member 201a situated at the water side may, as shown in figure 10A, be provided with an arched extending skirt 265 and the hinge seat 260 with a rubber guidance coating 263 at the top  
5 outside, which coating ends in a hardwood beam 261. When erecting and folding the retaining wall member 201a the skirt 265, which may be made of stainless steel, will run over the beam 264 and over the rubber coating 263. The rubber ensures permanent sealing, whereas the wooden beam has a heat-insulating working for the rubber layer 263 and serves as  
10 guidance and bearing point for the stainless steel skirt 265.

A water-retaining structure will usually have a very long length, and will therefore, as has already been suggested in figure 6, consist of several units. Between said units such sealing measures need to be taken that  
15 disturbing leakage is prevented. Examples of how to do this are shown in the figures 11A-C, in which the retaining wall members 301 have been provided with transverse end edges 301'. One of the edges 301' is provided with a rubber strip 380 attached to it, which strip itself is provided with an attachment strip 381, and a head 382. Said head 382 is  
20 mushroom-shaped, in order to sealingly abut both edge areas 301' at the waterside.

As suggested in figure 11B the head 382 may be provided with a metal protective hood 383, for protection and increasing its life span.

25

In the figure 11C the possible connection is shown against a fixed wall 370. It is noted that use is made here of a sealing material 380 that is UV-resistant and is resilient during either the erecting or folding-down movement of the water-retaining structure.

30

In figure 12 in which the same parts are referred to with the same reference numbers increased by a hundred, there is only one retaining wall

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member 401, and a shore plate 405. In this case the retaining wall member 401 at the location of 406 is hingingly connected to the foundation 403 and the shore plate 405 is hingingly connected at the location of hinge 407. The retaining wall here consists of one single plate, and at the  
5 location of hinge 402a an overflow will be present, if so desired. If a higher retaining structure is desired, segments can be attached to the single retaining wall, for instance two (such as in figure 1) or one (such as in figure 7).

10 The structure according to the invention can also be used as an adjustable spillway, such as shown in figures 13A and 13B.

In figure 13A it is shown that such a construction can also be accommodated, recessed in a body of a dike 511. Here the highest position of the hinge point 502a is almost equal to the crown of the body of the dike  
15 511. The hinge 507 is still at the location of the foundation 503, and the water level is H1. In figure 13B the hinge 507 has been moved slightly to the right in a continuously variable manner with means that are not further shown, and it is retained there, and the water-retaining level is H2. Said  
20 level H2 is too low for retaining water of the level H1, so that in the intermediate period water has been able to flow away in the direction D over the hinge 502a and over the shore plate 505, to a flood plain, grassed waterway or the like. By moving the hinge 507 in the direction E a water spillway can be formed which is situated below crown level.

## Claims

1. Device for retaining water comprising a foundation, a retaining wall movably attached to the foundation and a shore movably, particularly hingingly, attached to the foundation, in which the shore and the retaining wall are movably, particularly hingingly, attached to each other, and in  
5 which the retaining wall is provided with at least an internal longitudinal hinge about which the retaining wall can be turned.
2. Device according to claim 1, in which the retaining wall is provided with several internal longitudinal hinges.
- 10 3. Device according to claim 1 or 2, in which the retaining wall can be folded and unfolded between a non-operative position, in which the retaining wall is substantially horizontally situated, and a substantially vertical operative position.
- 15 4. Device according to claim 1, 2 or 3, in which the longitudinal hinge is adapted for a hinging movement on the side of the water to be retained, in which the retaining wall preferably is provided with stop means for limiting the rotation of the longitudinal hinge.
- 20 5. Device according to claim 4, furthermore provided with means for locking the longitudinal hinge in the upright position of the retaining wall.
- 25 6. Device according to claim 1 or 2, in which the internal longitudinal hinge is situated at the location of the connection of the shore with the retaining wall.

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7. Device according to claim 6, in which the lowest internal longitudinal hinge is situated at the location of the connection of the shore with the retaining wall or above it.
- 5      8. Device according to claim 7 and 4 or 5, in which the limiting or locking means are also adapted for securing the shore to the retaining wall.
9. Device according to any one of the preceding claims, in which the foundation is provided with an accommodation space for the retaining wall
- 10      in a position folded about the at least one longitudinal hinge.
10. Device according to claim 9, in which the foundation comprises a substantially U-shaped body.
- 15      11. Device according to claim 9 or 10, in which the foundation is provided with a base plate extending downward from it.
12. Device according to any one of the preceding claims, in which the shore can be hinged between a sideward downfolded position and an
- 20      operative position.
13. Device according to claim 9 and 12, in which the shore in downfolded position is accommodated in the accommodation space.
- 25      14. Device according to claim 9, in which the retaining wall forms a lid for the accommodation space.
15. Device according to any one of the claims 1-12, in which the shore is plate-shaped.
- 30      16. Device according to claims 9 and 15, in which the shore plate forms a lid for the accommodation space.



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17. Device according to any one of the preceding claims, in which at least one of the connections of the retaining wall and shore with the foundation can be moved in horizontal direction.

5        18. Device for retaining water comprising a foundation, a retaining wall movably attached to the foundation and a shore movably, particularly hingingly, attached to the foundation, in which the shore and the retaining wall are movable, particularly hingingly, attached to each other, and in  
10        the foundation can be moved and adjusted in horizontal direction, preferably continuously variable and in a driven manner.

19. Device according to any one of the preceding claims, accommodated in the crown of a body of a dike.

15

20. Device according to claim 19, in which the connections with the foundation are situated at a distance below the dike crown.

21. Device according to any one of the claims 1-18, accommodated in a  
20        quay.

22. Assembly of a number of devices according any one of the preceding claims, arranged in line, in which the devices can be separately erected and folded down.

25

23. Device according to one or more of the characterizing measures described in the attached description and/or shown in the attached drawings.

30        24. Water-retaining structure provided with a device according to any one of the preceding claims.

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25. Method comprising one or more of the characterizing steps described in the attached description and/or shown in the attached drawings.



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Fig.2

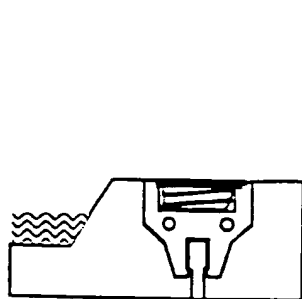
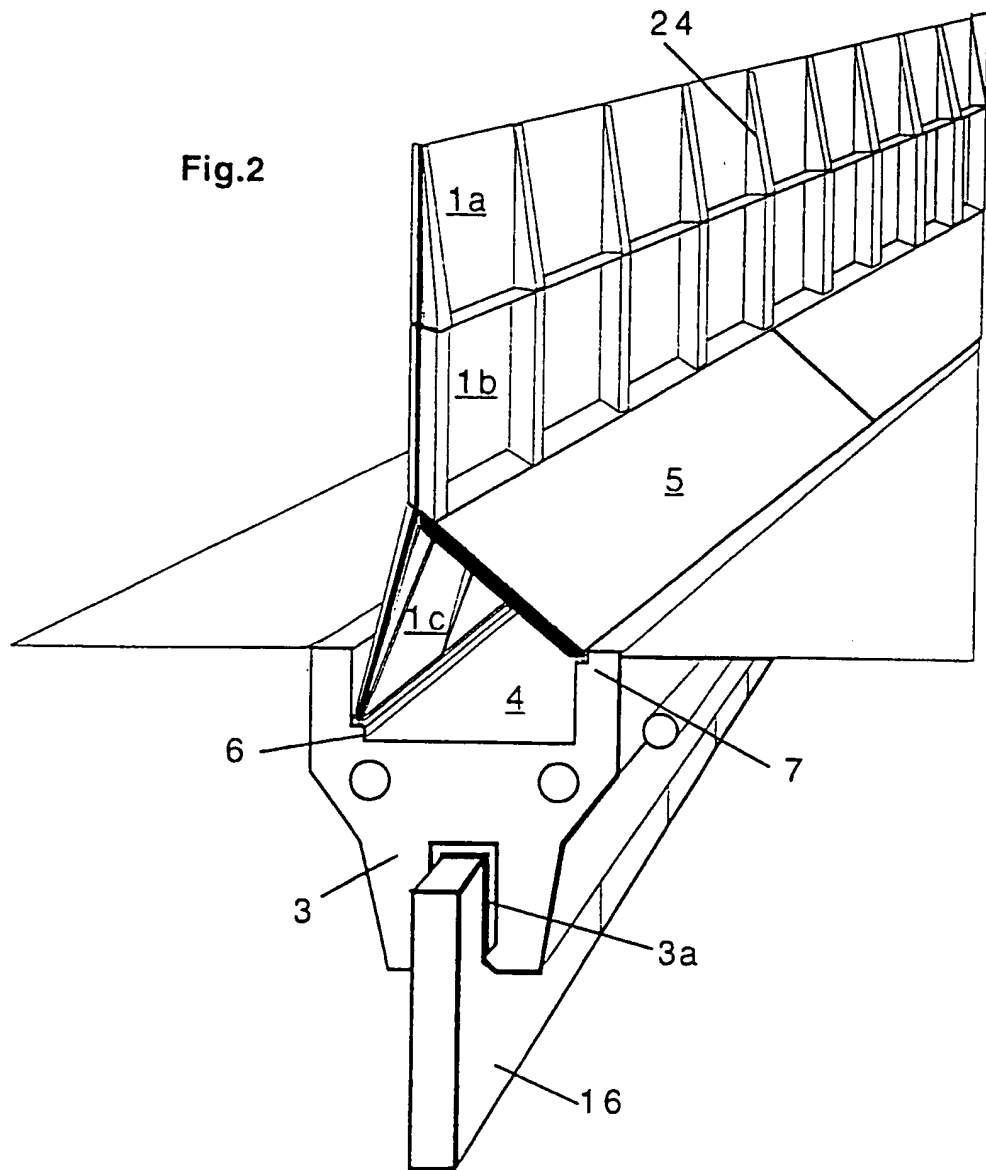


Fig.3A

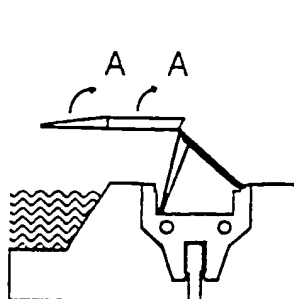


Fig.3B

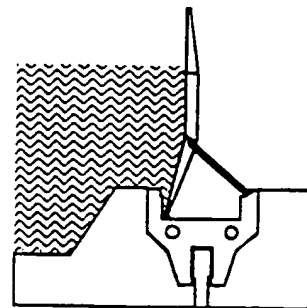


Fig.3C

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Fig. 4

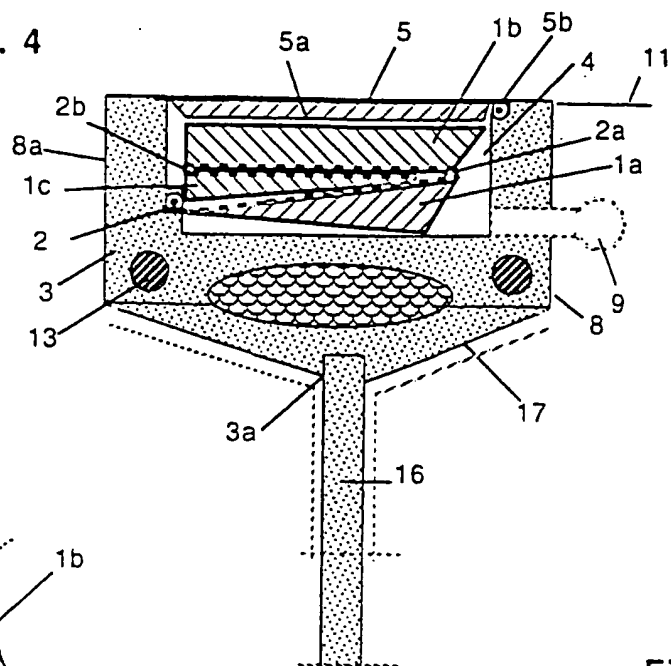


Fig.5

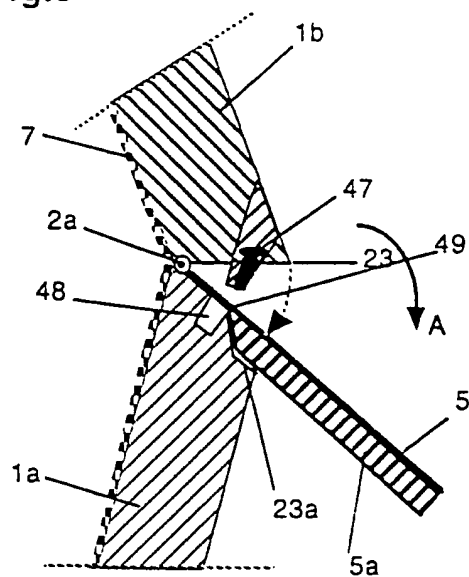


Fig.6

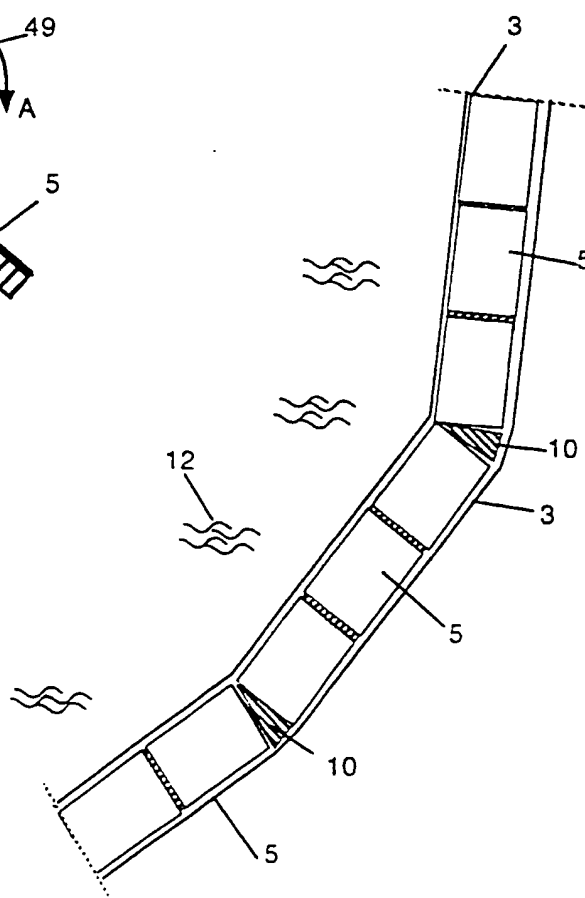


Fig. 5a

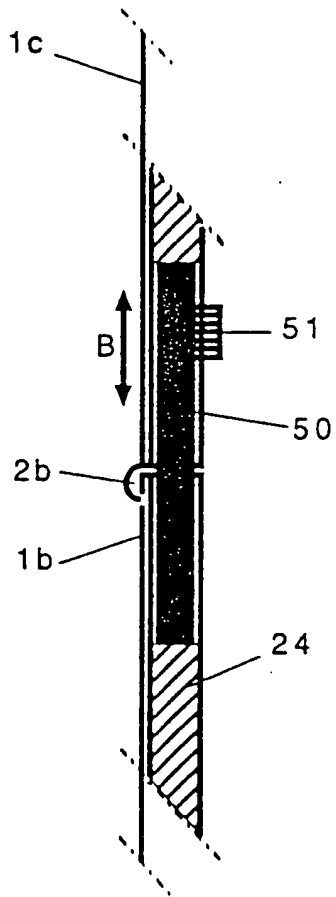
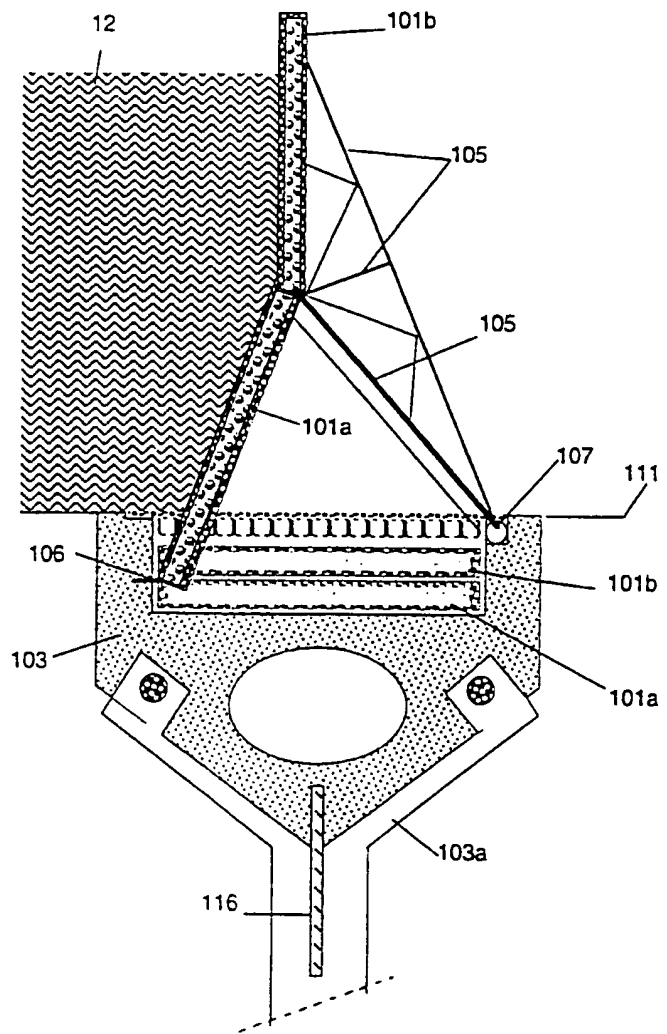


Fig. 7



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Fig. 8

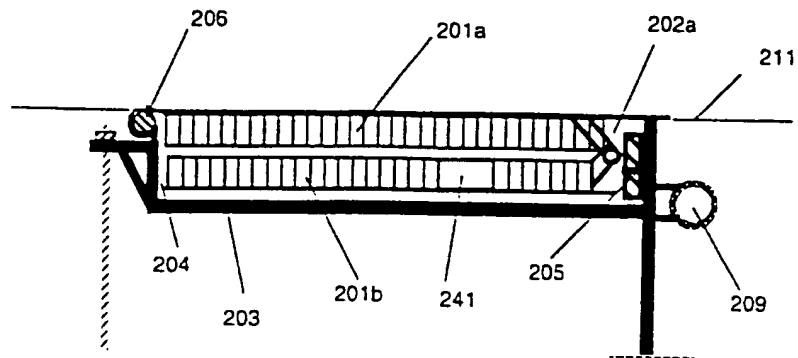
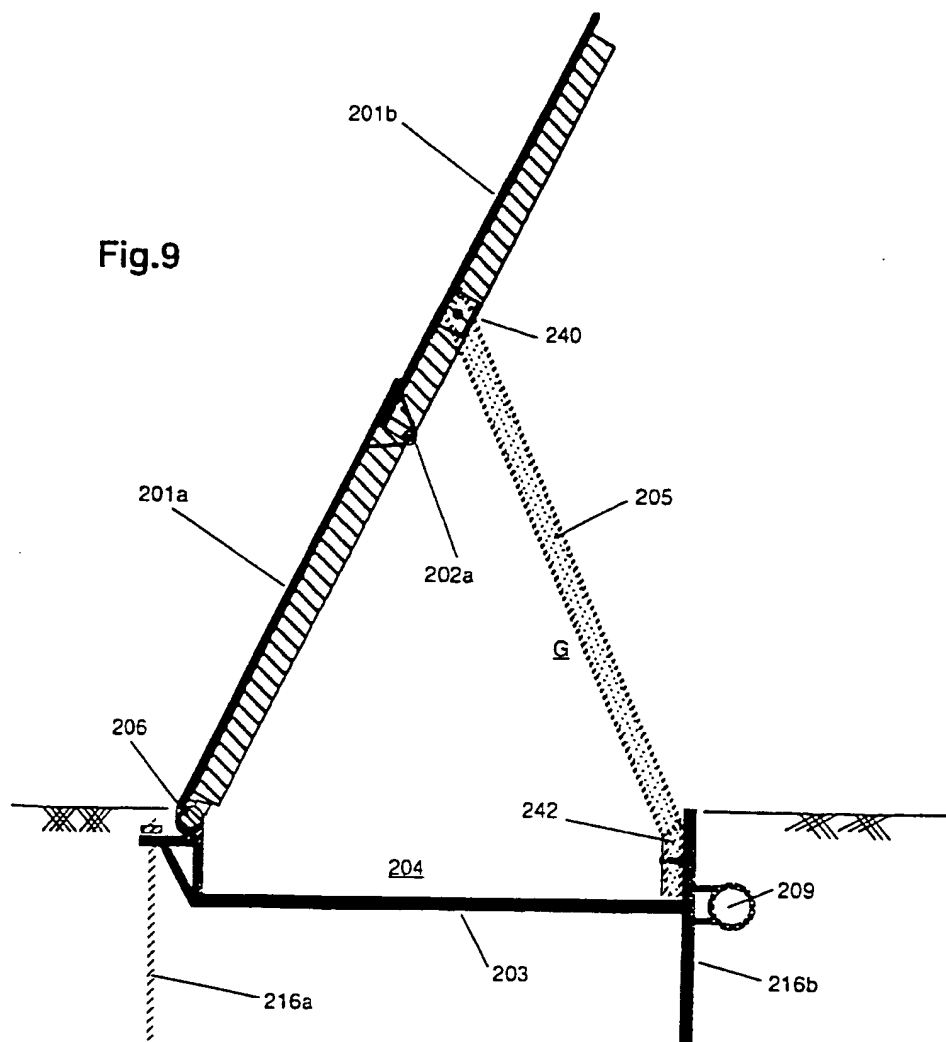


Fig.9



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Fig. 10

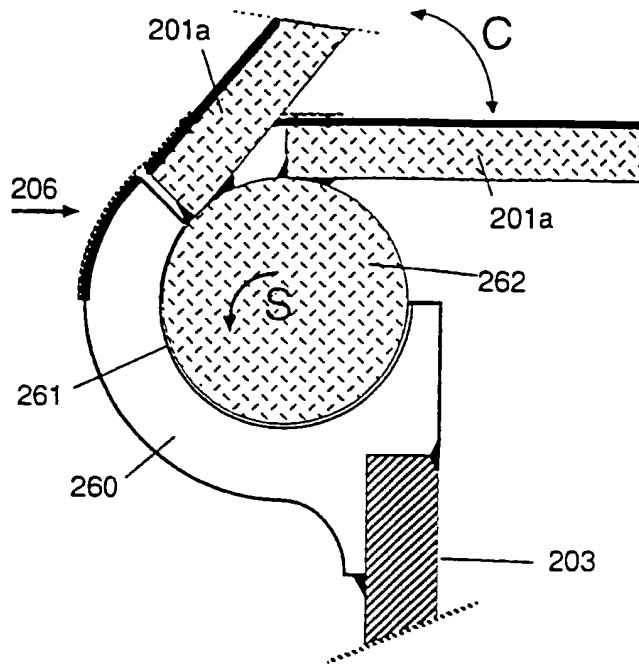


Fig. 10A

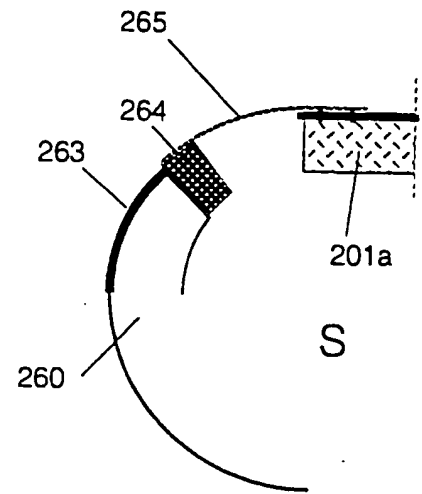


Fig. 11A

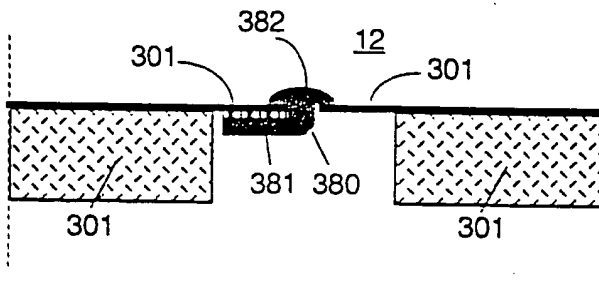


Fig. 11B

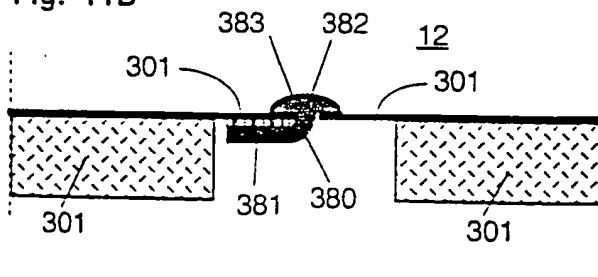
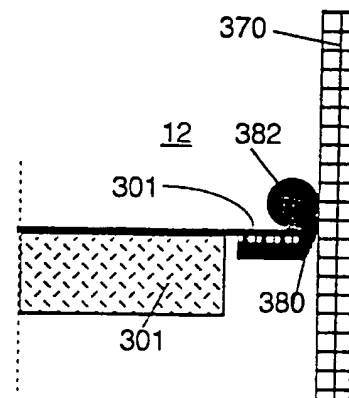


Fig. 11C





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Fig. 12

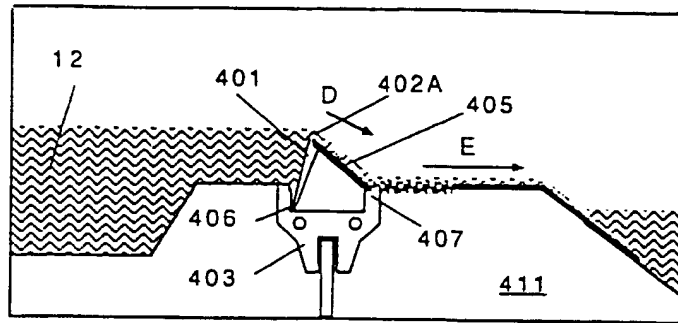


Fig. 13A

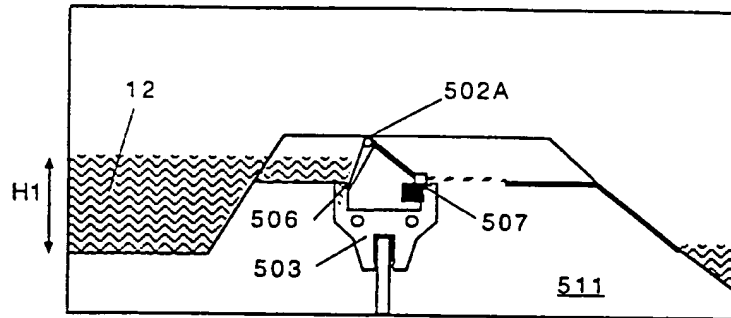
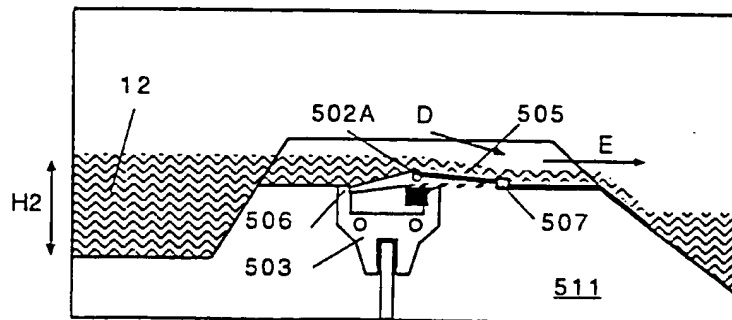


Fig. 13B



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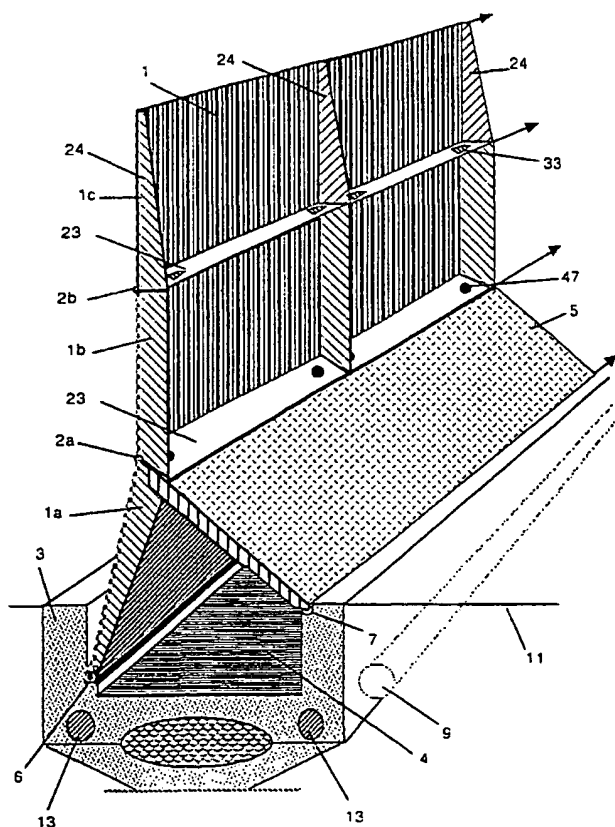
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[Continued on next page]

(54) Title: **WATER-RETAINING STRUCTURE**



(57) Abstract: Device for retaining water comprising a foundation (3), a retaining wall (1) movably attached to the foundation (3) and a shore (5) movably, particularly hingingly, attached to the foundation (3), in which the shore (5) and the retaining wall (1) are movably, particularly hingingly, attached to each other, and in which the retaining wall (1) is provided with at least an internal longitudinal hinge (2a, 2b) about which the retaining wall can be turned.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

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14 February 2002

# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 34 01 010 A (GEWERK EISENHUETTE WESTFALIA) 18 July 1985 (1985-07-18)	1,3,9,10,14
A	figures	13
X	US 4 352 592 A (AUBERT JEAN) 5 October 1982 (1982-10-05)	1,12,17
X	US 3 775 983 A (AUBERT J) 4 December 1973 (1973-12-04)	1,3,12,17
X	DE 299 16 355 U (KUSAN ANDRE) 17 February 2000 (2000-02-17)	1,3,9,12,14
	figures 3,4	
	--- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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Date of mailing of the international search report

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 01/00218

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 299 11 655 U (KUSAN KRISTIAN) 28 October 1999 (1999-10-28) figure 5 ---	1,4,9, 11,14
A	WO 97 18369 A (BELARBI SAHBI) 22 May 1997 (1997-05-22) page 5, line 1 - line 3 -----	1

# INTERNATIONAL SEARCH REPORT

Int'l application No.  
PCT/NL 01/00218

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-17, 19-22, 24

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-17,19-22,24

The invention disclosed in claims 1-17,19-22 and 24 relates to a device for retaining water, whereby the retaining wall is provided with an internal longitudinal hinge, about which the retaining wall can be turned.

2. Claims: 18-22, 24

The invention disclosed in claims 18-22 and 24 relates to a device for retaining water, whereby one of the connections between the foundation and either the wall or the shore is horizontally moveable and adjustable.

3. Claim : 23

The subject-matter of claim 23 includes no specific technical features. It is therefore not possible to be specific about definition of the invention to which this claim relates.

4. Claim : 25

The subject-matter of claim 25 includes no specific technical features. It is therefore not possible to be specific about definition of the invention to which this claim relates.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/NL 01/00218

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 3401010	A	18-07-1985	DE 3401010 A1	18-07-1985
US 4352592	A	05-10-1982	FR 2458633 A1	02-01-1981
			AT 6083 T	15-02-1984
			BR 8003641 A	05-01-1981
			DE 3066362 D1	08-03-1984
			EG 14760 A	30-06-1985
			EP 0021880 A1	07-01-1981
			HU 184298 B	30-07-1984
			PL 224923 A1	24-04-1981
			YU 156180 A1	30-04-1983
US 3775983	A	04-12-1973	FR 2148836 A5	23-03-1973
			IT 965967 B	11-02-1974
DE 29916355	U	17-02-2000	DE 29916355 U1	17-02-2000
DE 29911655	U	28-10-1999	DE 29911655 U1	28-10-1999
WO 9718369	A	22-05-1997	SE 505394 C2	18-08-1997
			AU 7660096 A	05-06-1997
			CZ 9801459 A3	16-09-1998
			EP 0861360 A1	02-09-1998
			PL 326652 A1	12-10-1998
			SE 9504024 A	15-05-1997
			WO 9718369 A1	22-05-1997
			US 6216399 B1	17-04-2001